

## **2. Remark/Discussion of Issues**

### ***Claims***

By the present amendment, claim 13 has been canceled, without prejudice and without disclaimer of the subject matter. Claims 1, 3-8, 10-12 and 16-19 are pending in the application, which Applicants respectfully submit are in condition for allowance.

### ***35 U.S.C. § 103 Rejections***

Applicants rely at least on the following standards with regard to proper rejections under 35 U.S.C. § 103(a). A *prima facie* case of obviousness has three requirements. First, the prior art relied upon, coupled with the knowledge generally available in the art at the time of the invention, requires some reason that the skilled artisan would modify a reference or to combine references. *Princeton Biochemicals, Inc. v. Beckman Coulter, Inc.*, 411 F.3d 1332 (Fed. Cir. 2005). The Supreme Court has, however, cautioned against the use of “rigid and mandatory formulas” particularly with regards to finding reasons prompting a person of ordinary skill in the art to combine elements in the way the claimed new invention does. *KSR Int’l Co. v. Teleflex Inc.*, 127 S. Ct. 1727 (2007). Second, the proposed modification of the prior art must have had a reasonable expectation of success, determined from the vantage point of the skilled artisan at the same time the invention was made. In other words, a hindsight analysis is not allowed. *Amgen, Inc. v. Chugai Pharm. Co.*, 927 F.2d 1200 (Fed. Cir. 1991). Lastly, the prior art reference or combination of references must teach or suggest all the limitations of the claims. *In re Wilson*, 424 F.2d 1382 (C.C.P.A. 1970).

Applicants’ silence on certain aspects of the rejection is by no means a concession as to their propriety. Rather, because the applied art fails to disclose at least one feature of the claims, for at least the reasons discussed below, Applicants respectfully submit that the rejections are improper and should be withdrawn.

***Claims 1, 3-7, 10 and 16***

The Office Action rejects claims 1, 3-7, 10 and 16 under 35 U.S.C. § 103(a) as being unpatentable over VOEGELI et al. (U.S. Patent No. 5,561,896) and evidenced by PELECKY et al. (“Magnetic Properties of Nanostructured Materials”) and FOX et al. (U.S. Patent No. 5,974,657). *See* Office Action, p. 2. Applicants respectfully traverse the rejection at least for the reasons set forth below.

**Claim 1**

The Office Action asserts that selecting a physical process from a plurality of different physical processes having corresponding activation energies in the magnetic layer-structure based on the current pulse is taught by VOEGELI et al. (heating biasing region until a certain time period above a critical conversion temperature) and PELECKY et al. (changes in magnetization of a material that occur through activation over an energy barrier). *See* Office Action, pp. 2-3 (citing col. 5, lines 30-35 of VOEGELI et al; p. 1771 of PELECKY et al. However, VOEGELI et al. only discloses one physical process, i.e., interdiffusion of constituents between layers of sensor laminate. *See, e.g.,* col. 3, lines 50-60; col. 5, lines 30-35. Although interdiffusion may apparently be performed on different layers/materials, it is still the same physical process. *See, e.g.,* col. 5, lines 27-37; col. 6, line 66 – col. 7, line 2. Similarly, PELECKY et al. only discloses a process for changing magnetization of magnetic material (see, *e.g.,* p. 1771).

The Office Action further asserts “that ‘different’ is a relative term that will be given its broadest and reasonable interpretation,” and thus performing interdiffusion of constituents between layers of sensor laminate performed on different materials, as disclosed by VOEGELI et al., teaches “different” physical processes. *See* Office Action, p. 12. (The Office Action goes on to state that it does not rely on PELECKY et al. to teach disclosing performing different physical processes (*Id.*), and thus Applicants do not further address PELECKY et al.)

However, Applicants respectfully submit that the Examiner's construction of "different" in claim 1 is overly broad, particularly in view of the Specification. It is well established that, "[d]uring patent examination, the pending claims must be 'given their broadest reasonable interpretation consistent with the specification.'" See MPEP 2111 (emphasis added) (quoting *Phillips v. AWH Corp.*, 415 F.3d 1303, 1316, 75 USPQ2d 1321, 1329 (Fed. Cir. 2005)). More particularly, the *Phillips* Court stated as follows:

The Patent and Trademark Office ("PTO") determines the scope of claims in patent applications not solely on the basis of the claim language, but upon giving claims their broadest reasonable construction "in light of the specification as it would be interpreted by one of ordinary skill in the art." *In re Am. Acad. of Sci. Tech. Ctr.*, 367 F.3d 1359, 1364[, 70 USPQ2d 1827] (Fed. Cir. 2004). Indeed, the rules of the PTO require that application claims must "conform to the invention as set forth in the remainder of the specification and the terms and phrases used in the claims must find clear support or antecedent basis in the description so that the meaning of the terms in the claims may be ascertainable by reference to the description." 37 CFR 1.75(d)(1)."

*Id.* (emphasis added).

When viewed in light of the specification, Applicants respectfully submit that selecting a physical process from a plurality of different physical processes having corresponding activation energies in the magnetic layer-structure based on the current pulse, as recited in claim 1, refers to processes actually different from one another – not the same process performed on different materials. Indeed, the description of selecting different physical processes includes identifying examples of actual different processes:

In an advantageous method the electric current pulse is used to select a physical process in the layer-structure. Such a physical process can be: diffusion (of atoms), a change in composition at interfaces, a change in resistance, a change in strength or direction of pair ordering (easy axis orientation), a

change in magnetization direction, a change in structure or phase (amorphous/crystalline/ crystalline orientation), a change in stress and strain, or a change of the concentration of a dopant near the surface (or near an interface).

The transition of a physical process from a certain state to another certain state is dependent on the presence of (an) energy barrier(s) between these states. Such an energy barrier is also referred to as activation energy.

See Specification, p. 3, lines 15-23. Applicants respectfully submit that there is no teaching or suggestion that performing the same process on different material constitutes a different process, as asserted by the Examiner. Thus, Applicants respectfully submit that such an interpretation is unreasonable in view of the Specification.

Accordingly, Applicants respectfully submit that the Examiner has not established a *prima facie* case of obviousness, and that VOEGELI et al. and PELECKY et al., either alone or in any proper combination, do not teach or suggest all limitations of claim 1. The rejection of claim 1 under 35 U.S.C. § 103(a) therefore should be withdrawn.

#### Claims 3-7, 10 and 16

Claims 3-7, 10 and 16 are allowable at least because they depend claim 1, which has been shown to be allowable, as well as in view of their additional recitations. Accordingly, the rejection of claims 3-7, 10 and 16 under 35 U.S.C. §103(a) should be withdrawn.

#### ***Claims 1 and 18***

The Office Action rejects claims 1 and 18 under 35 U.S.C. § 103(a) as being unpatentable over VOEGELI et al. in view of SHAPPIR et al. (U.S. Patent App. Pub. No. 2003/0156456) evidenced by PELECKY et al. See Office Action, p. 4. Applicants respectfully traverse the rejection at least for the reasons set forth

below.

Claim 1

Applicants respectfully traverse the rejection of claim 1 at least for substantially the same reasons discussed above. Further, Applicants submit that SHAPPIR et al. does not cure the deficiencies of VOEGELI et al. and PELECKY et al. In particular, the Office Action relies on SHAPPIR et al. to teach selecting a physical process from a plurality of different physical processes having corresponding activation energies in the magnetic layer-structure based on the current pulse. However, SHAPPIR et al. does not disclose selecting a physical process from a plurality of different physical processes. Rather, SHAPPIR et al. is directed to a method of operating a non-volatile memory cells by application of voltage pulses, not current pulses, as recited in claim 1. Also, SHAPPIR et al. gives two examples, of how bits are stored in non-volatile memory cells using voltage pulses. One type memory cell involves increasing threshold voltages of the bits (para. [0029]). The other type memory cell (relied on by the Examiner) involves changing direction of magnetization vectors in magnetic layers (para. [0030]). With respect to the latter type of memory cell, the bits are represented by changes in resistance corresponding to the changes in the direction of the magnetization vectors. Accordingly, SHAPPIR et al. teaches only one physical process (with respect to the type of memory cell), which is changing the direction of magnetization vector. Although this process may also change resistance, it is still one process.

Further, the combination of VOEGELI et al., SHAPPIR et al. and PELECKY et al. is improper because there is no rationale reason that a skilled artisan would modify a method of fabricating the magnetoresistive transducer disclosed by VOEGELI et al., coupled with the knowledge generally available in the art at the time of the invention, with a method of operating (programming/erasing) the non-volatile memory cell disclosed by SHAPIR et al. *See Princeton Biochemicals, Inc. v. Beckman Coulter, Inc.*, 411 F.3d 1332 (Fed. Cir. 2005).

There would be no reasonable expectation of success in doing so, and thus the motivation appears to be improper hindsight analysis. *See Amgen, Inc. v. Chugai Pharm. Co.*, 927 F.2d 1200 (Fed. Cir. 1991).

Accordingly, Applicants respectfully submit that the Examiner has not established a *prima facie* case of obviousness, and that VOEGELI et al., PELECKY et al., and SHAPPIR et al. either alone or in any proper combination, do not teach or suggest all limitations of claim 1. The rejection of claim 1 under 35 U.S.C. § 103(a) therefore should be withdrawn.

#### Claims 18

Claim 18 is allowable at least because it depends from claim 1, which has been shown to be allowable, as well as in view of its additional recitations. Accordingly, the rejection of claim 18 under 35 U.S.C. §103(a) should be withdrawn.

#### ***Claim 17***

The Office Action rejects claim 17 under 35 U.S.C. § 103(a) as being unpatentable over VOEGELI et al. evidenced by PELECKY et al. and further in view of MATTHEIS et al. (U.S. Patent App. Pub. No. 2001/0020847), or over VOEGELI et al. in view of SHAPPIR et al. and evidenced by PELECKY et al. *See* Office Action, p. 5. Applicants respectfully traverse the rejection, and assert that claim 17 is allowable at least because it depends from independent claim 1, which Applicants submit has been shown to be allowable, as well as in view of its additional recitations.

#### ***Claims 8, 11 and 19***

The Office Action rejects claims 8, 11 and 19 under 35 U.S.C. § 103(a) as being unpatentable over VOEGELI et al. evidenced by PELECKY et al. and further in view of GILL (U.S. Patent No. 6,118,622), or over VOEGELI et al. in view of SHAPPIR et al. and evidenced by PELECKY et al. *See* Office Action, p.

6. Applicants respectfully traverse the rejection at least for the reasons set forth below.

Claims 8 and 11

Claims 8 and 11 are allowable at least because they depend, directly or indirectly, from claim 1, which has been shown to be allowable, as well as in view of their additional recitations. Accordingly, the rejection of claims 8 and 11 under 35 U.S.C. §103(a) should be withdrawn.

Claim 19

With respect to claim 19 (as well as claim 8), the Office Action acknowledges that VOEGELI et al. evidenced by PELECKY et al. is silent in applying a magnetic field to the at least one bias layer during the current pulse and switching off the magnetic field after a temperature of the bias layer decreases to below Néel or Curie temperature, and therefore relies on GILL to teach the same. *See* Office Action, pp. 6-7 (citing GILL, col. 4, lines 1-35).

Claim 19 recites “applying a magnetic field in a desired direction to the at least one bias layer,” and “applying an electric current to the magnetic layer-structure ... that heats the magnetic layer-structure while the magnetic field is applied to the at least one bias layer...” (emphasis added). In comparison, GILL discloses hard bias layers 115 and 116, and specifically states that “a different external magnetic field is applied to the sensor 100 to orient the hard bias layers 115-116 in the direction 113.” *See* col. 9, lines 45-48 (emphasis added).

However, the electric current pulse applied to heat the magnetic layer structure, discussed in col. 4, lines 1-35 of GILL (as cited by the Office Action) is no longer being applied when the magnetic field is being applied to the hard bias layers 115 and 116. *See* col. 4, lines 22-29; col. 9, lines 44-56.

Accordingly, Applicants respectfully submit that the Examiner has not established a *prima facie* case of obviousness, and that VOEGELI et al., PELECKY et al. and GILL, either alone or in any proper combination, do not

teach or suggest all limitations of claim 19. The rejection of claim 19 under 35 U.S.C. § 103(a) therefore should be withdrawn.

***Claim 12***

The Office Action rejects claims 12 under 35 U.S.C. § 103(a) as being unpatentable over VOEGELI et al. in view of GILL evidenced by PELECKY et al. and further in view of LENSSEN (U.S. Patent No.6,501,678), or over VOEGELI et al. in view of SHAPPIR et al. and GILL, and evidenced by PELECKY et al. *See* Office Action, p. 7. Applicants respectfully traverse the rejection, and assert that claim 12 is allowable at least because it depends indirectly from independent claim 1, which Applicants submit has been shown to be allowable, as well as in view of its additional recitations.

***Claims 1, 3 and 6-7***

The Office Action rejects claims 1, 3 and 6-7 under 35 U.S.C. § 103(a) as being unpatentable over FOX et al. evidenced by PELECKY et al. and in view SHAPPIR et al. *See* Office Action, p. 9. Applicants respectfully traverse the rejection at least for the reasons set forth below.

**Claim 1**

Applicants respectfully traverse the rejection of claim 1 at least for substantially the same reasons discussed above, and further submit that FOX et al. does not cure the deficiencies of VOEGELI et al. and PELECKY et al. In particular, FOX et al. discloses a process for resetting magnetization of pinned and hard biasing layers (see, e.g., Abstract). With respect to selecting a physical process from a plurality of different physical processes having corresponding activation energies in the magnetic layer-structure based on the current pulse, the Office Action asserts that FOX et al. teaches resistance as another property that can be changed. *See* Office Action, p. 10 (citing col. 7, lines 59-65). However, FOX et al. discloses a change in resistance in response to magnetic fields rotating



moment 214 relative to pinned moment 212, not in response to a current pulse, or more particularly to a current pulse having a duration and an amplitude adapted to an activation energy of the selected physical process, as recited in claim 1.

Claims 3 and 6-7

Claims 3 and 6-7 are allowable at least because they depend claim 1, which has been shown to be allowable, as well as in view of their additional recitations. Accordingly, the rejection of claims 1, 3 and 6-7 under 35 U.S.C. §103(a) should be withdrawn.

***Conclusion***

In view of the foregoing explanations, Applicants respectfully request that the Examiner reconsider and reexamine the present application, allow claims 1, 3-8, 10-12 and 16-19, and pass the application to issue. In the event that there are any outstanding matters remaining in the present application, the Examiner is invited to contact Van C. Ernest (Reg. No. 44,099) at (571) 283-0720 to discuss these matters.

Respectfully submitted on behalf of:  
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